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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/511,679	10/18/2004	Masato Machida	Q83987	6368

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EXAMINER	
PATEL, TAYAN B	
ART UNIT	PAPER NUMBER
1795	
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02/21/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/511,679	MACHIDA ET AL.	
	Examiner	Art Unit	
	TAYAN PATEL	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 October 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 13, 14, 16, and 19-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Kobayashi et al. (5,352,337).

Regarding claim 13, Kobayashi et al. teaches a nitrogen decomposing element (comprising: a conductive solid electrolyte film for selectively allowing a hydrogen ion to pass through (col. 3 lines 46-60); a first electrode made of an electrically conductive base material disposed on the conductive electrolyte film (an anodic portion [3] disposed on an electrolyte [1] consisting of a variety of conductive base materials, col. 4 lines 17-22 and figure 1) and a catalyst for accelerating anodic oxidation (anodic portion contains a reducing catalyst accelerating oxidation (col. 4 lines 14-16 and col. 4 lines 23-28); a second electrode made of an electronic conductivity base material disposed on the other part of the surface of the conductive solid electrolyte film (a second electrode or conductive cathodic portion is formed on the electrolyte (col. 4 lines 4-11 and col. 4 lines 29-32) and a catalyst for accelerating cathodic reduction (cathodic portion can further have a catalyst to accelerate reduction consisting of oxides of group 5a, 6,a, 7a elements or transition elements carried on alumina, cerium oxide etc, col. 4

lines 33-39); and a platinum group catalyst supported by a porous metal oxide disposed to be contacted to the second electrode (the reducing catalyst is preferably porous, col. 4 lines 6-12 col. 6 lines 5-9 and consist of a variety of metal oxides or transition elements carried on a metal oxide, col. 4 lines 33-39 and further can have a platinum layer that can either be added to the cathodic portion or provided as a surface layer usually plated on col. 4 lines 40-49 col. 8 lines 49-52).

Regarding claim 14, Kobayashi et al. teaches two electrodes, a cathodic portion [2] and an anodic portion [3] being disposed on opposing sides of an electrolyte [1] (col. 8 lines 18-25, figure 1).

Regarding claim 16, Kobayashi et al. teaches a cathodic portion consisting of a mixed layer consisting of a conductive base material and a cathodic catalyst, (a reducing catalyst can consist of a variety of oxides and elements carried on a conductive base material of alumina or CeO2 col. 4 lines 33-39) a platinum group catalyst (platinum or palladium can further be added to or on the surface to further cathodic reduction (col. 4 lines 40-49) and putting the cathodic portion onto the surface of a conductive solid electrolyte film (col. 4 lines 46 lines 46-60 col. 4 lines 4-6).

Regarding claims 19-20, Kobayashi et al. teaches a porous metal oxide layer consisting of an amphoteric oxide: aluminum oxide (col. 5 lines 16-21 and col. 6 lines 5-8).

Regarding claim 21, Kobayashi et al. teaches the platinum group catalyst can consist of platinum and palladium (col. 4 lines 40-44).

Regarding claim 22, Kobayashi et al. teaches gas supply ports for supplying an anode and cathode gas into a frame (col. 8 lines 15-18); a gas exhaust port for exhausting the gas in the frame to the outside (col. 8 lines 26-29, figure 1); and a power source for applying a dc voltage between the first and second electrode (col. 8 lines 30-33).

Regarding claim 23, Kobayashi et al. teaches a gas containing water vapor supplied as the anode gas (col. 8 lines 17-18).

Regarding claim 24, Kobayashi et al. teaches a gas containing nitrogen oxide is supplied as the cathode gas (col. 8 lines 15-17).

Claim Rejections - 35 USC § 103

6. Claim 15, and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (5,352,337) as applied to claim 13 above, and further in view of Nakagawa et al. (JP 08-168673).

Kobayashi et al. teaches a NOX decomposing apparatus using a two electrode structure, the electrodes placed on opposing planes of an electrolyte as mentioned in claim 1 above, but fails to disclose the electrodes being provided on the same plane surface.

Nakagawa et al. is directed to an electrolyte having two electrodes (anode and cathode) being used to reduce NOX exhaust gas (abstract). Nakagawa et al. teaches a NOX exhaust gas treatment using a cathode [6] on a solid electrolyte [2] and an anode [4] disposed on the opposite plane (abstract). Nakagawa et al. teaches a cathode [22]

and an anode [20] on the same plane as each other in a device used for reducing NOX exhaust gas. (paragraph 20, drawing 3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to alter the two electrode structures used for reducing NOX exhaust gas as Kobayashi et al. and change the orientation to a two electrode structure in the same plane as taught by Nakagawa et al. because the orientation is an obvious variation of a solid electrolyte being between both anode and cathode and is known to be effective.

Regarding claim 22, Kobayashi et al. teaches gas supply ports for supplying an anode and cathode gas into a frame (col. 8 lines 15-18); a gas exhaust port for exhausting the gas in the frame to the outside (col. 8 lines 26-29, figure 1); and a power source for applying a dc voltage between the first and second electrode (col. 8 lines 30-33).

Regarding claim 23, Kobayashi et al. teaches a gas containing water vapor supplied as the anode gas (col. 8 lines 17-18).

Regarding claim 24, Kobayashi et al. teaches a gas containing nitrogen oxide is supplied as the cathode gas (col. 8 lines 15-17).

7. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (5,352,337) as applied to claim 13 above, and further in view of Yokota et al. (JP 07-246318).

Regarding claim 17 and 18, Kobayashi et al. teaches all the limitations of claim 13 mentioned above but fails to disclose the metal oxide being an acidic oxide.

Yokota et al. is directed to reducing NOX exhaust gas at low temperature using a porous carried zeolite structure consisting of SiO2 and Al2O3 and further a layer of platinum disposed on the porous carrier (abstract). Yokota et al. further teaches the porous carried discussed has a high hydrophobic property thus preventing steam from sticking to the surface allowing for reduction to proceed more smoothly and at lower temperatures (abstract).

It would have been obvious to substitute the porous zeolite carrier structure containing SiO2 and Al2O3 with a platinum layer disposed on the surface as discussed by Yokota et al. in place of the porous alumina carrier structure with a platinum layer disposed on the surface as discussed by Kobayashi et al. because it would allow for the reduction of NOX exhaust gas to be performed much more smoothly and at lower temperatures.

Regarding claim 22, Kobayashi et al. teaches gas supply ports for supplying an anode and cathode gas into a frame (col. 8 lines 15-18); a gas exhaust port for exhausting the gas in the frame to the outside (col. 8 lines 26-29, figure 1); and a power source for applying a dc voltage between the first and second electrode (col. 8 lines 30-33).

Regarding claim 23, Kobayashi et al. teaches a gas containing water vapor supplied as the anode gas (col. 8 lines 17-18).

Regarding claim 24, Kobayashi et al. teaches a gas containing nitrogen oxide is supplied as the cathode gas (col. 8 lines 15-17).

8. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (5,352,337) and Yokota et al. (JP 07-246318) as applied to claims 17 and 18 above, and further in view of Oshima et al. (5,272,871).

Regarding claim 25, modified Kobayashi et al. teaches all the claimed limitations of claim 22 mentioned above but fails to disclose: a sensor for detecting a concentration of nitrogen oxide, and a control device for controlling a magnitude of a current flowing between a first and second electrodes and an energization time in accordance with sensed conditions.

Oshima et al. is directed to the reduction of NOX exhaust gas (abstract). Oshima et al. teaches a NOX sensor [6] provided in the exhaust stream capable of determining the flow rate of NOX exhaust. The NOX concentration is computed from the outputs of the sensors [6] and then an electrolytic cell, which would have two electrodes located in the hydrogen generator [1] is activated to control a voltage and current supplied to it (figure 1, col. 4 lines 56-63).

It would have been obvious to one having ordinary skill in the art to use a sensor measuring NOX exhaust gas concentration and controlling the current of an electrolytic cell as done by Oshima et al. into the NOX reducing apparatus as discussed by modified Kobayashi et al. as it would allow for more accurate control of the NOX reduction process based on a sensed concentration of NOX concentration in the exhaust stream.

Regarding claim 26, Kobayashi et al. teaches a cathodic chamber [8] consisting of a cathodic portion [2] with a porous metal oxide and platinum group catalyst (see

remarks for claim 13). Oshima et al. teaches a NOX sensor measuring the concentration of exhausts gases and altering a voltage and current based on sensed conditions (col. 4 lines 56-63).

9. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. as applied and Nakagawa et al (JP 08-168673) to claim 22 above, and further in view of Oshima et al. (5,272,871).

Regarding claim 25, modified Kobayashi et al. teaches all the claimed limitations of claim 22 mentioned above but fails to disclose: a sensor for detecting a concentration of nitrogen oxide, and a control device for controlling a magnitude of a current flowing between a first and second electrodes and an energization time in accordance with sensed conditions.

Oshima et al. is directed to the reduction of NOX exhaust gas (abstract). Oshima et al. teaches a NOX sensor [6] provided in the exhaust stream capable of determining the flow rate of NOX exhaust. The NOX concentration is computed from the outputs of the sensors [6] and then an electrolytic cell, which would have two electrodes located in the hydrogen generator [1] is activated to control a voltage and current supplied to it (figure 1, col. 4 lines 56-63).

It would have been obvious to one having ordinary skill in the art to use a sensor measuring NOX exhaust gas concentration and controlling the current of an electrolytic cell as done by Oshima et al. into the NOX reducing apparatus as discussed by modified Kobayashi et al. as it would allow for more accurate control of the NOX

reduction process based on a sensed concentration of NOX concentration in the exhaust stream.

Regarding claim 26, Kobayashi et al. teaches a cathodic chamber [8] consisting of a cathodic portion [2] with a porous metal oxide and platinum group catalyst (see remarks for claim 13). Oshima et al. teaches a NOX sensor measuring the concentration of exhausts gases and altering a voltage and current based on sensed conditions (col. 4 lines 56-63).

10. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. as applied to claim 22 above, and further in view of Oshima et al. (5,272,871).

Regarding claim 25, Kobayashi et al. teaches all the claimed limitations of claim 22 mentioned above but fails to disclose: a sensor for detecting a concentration of nitrogen oxide, and a control device for controlling a magnitude of a current flowing between a first and second electrodes and an energization time in accordance with sensed conditions.

Oshima et al. is directed to the reduction of NOX exhaust gas (abstract). Oshima et al. teaches a NOX sensor [6] provided in the exhaust stream capable of determining the flow rate of NOX exhaust. The NOX concentration is computed from the outputs of the sensors [6] and then an electrolytic cell, which would have two electrodes located in the hydrogen generator [1] is activated to control a voltage and current supplied to it (figure 1, col. 4 lines 56-63).

It would have been obvious to one having ordinary skill in the art to use a sensor measuring NOX exhaust gas concentration and controlling the current of an electrolytic cell as done by Oshima et al. into the NOX reducing apparatus as discussed by Kobayashi et al. as it would allow for more accurate control of the NOX reduction process based on a sensed concentration of NOX concentration in the exhaust stream.

Regarding claim 26, Kobayashi et al. teaches a cathodic chamber [8] consisting of a cathodic portion [2] with a porous metal oxide and platinum group catalyst (see remarks for claim 13). Oshima et al. teaches a NOX sensor measuring the concentration of exhausts gases and altering a voltage and current based on sensed conditions (col. 4 lines 56-63).

Response to Arguments

Applicant's arguments filed 09 November 2007 have been fully considered but they are not persuasive because Kobayashi anticipates the claimed invention as written. The response to arguments details why an anticipation rejection was proper.

35 USC 112 Rejections

The rejection under 35 USC 112 regarding claims 16 and 22-26 has been withdrawn because Applicant's arguments are persuasive in clarifying the distinction between the catalyst layers.

35 USC 102 Rejections

I. **Regarding claim 13, Kobayashi et al does not describe a platinum group catalyst supported by a metal oxide is combined to an element structure including a conductive solid electrolyte film, a first electrode disposed on a part of a surface of the conductive solid electrolyte and a second electrode disposed on the other part of the surface thereof.**

In response, Examiner contends that Kobayashi et al describes a platinum group catalyst, such as platinum or palladium, supported on alumina (aluminum oxide as the metal oxide). See column 4, lines 33-44. This reducing catalyst is combined with electrode which is in contact with the solid electrolyte film on one side. See figure 1.

II. **Regarding claim 13, Kobayashi et al does not describe the metal oxide made of porous metal oxide.**

In response, Examiner contends that the metal oxide is porous because the reducing catalyst which comprises the platinum group catalyst has a surface layer with a preferred porosity of from about 50 to about 90%. See column 6, lines 1-10.

III. **Regarding claim 13, Kobayashi et al does not describe the metal oxide to be contacted with the second electrode.**

In response, Examiner contends that the claim as written does not differentiate the platinum group catalyst supported by a porous metal oxide from the catalyst for accelerating cathodic reduction. A broad interpretation of the claim suggests that these catalysts are the same, more particularly a further limitation of the catalyst on the second electrode. Therefore, the catalyst is in contact with the second electrode.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TAYAN PATEL whose telephone number is (571)272-9806. The examiner can normally be reached on Monday-Thursday, 8 AM-6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TBP

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795